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ABSTRACT

This paper reviews an earlier study examining the variables affecting the success of distance learning programs. In 1995, Dr. Ellen Wagner developed a list identifying the following 16 variables which need to be considered if a distance learning program is to be successful: needs assessment; audience analysis; instructional design; course selection; course reconfiguration; lesson planning; interactive instructional strategies; instructional delivery systems; adapting media and materials for distance delivery; developing effective graphics; using facilitators at distance education sites; learner and instructor support services; program evaluation and learner assessment; organized readiness; inter-institutional partnerships; and regulatory environment. Nine case studies and three non-case study journal articles that describe distance learning activities and/or success factors were reviewed to test the validity of these variables. Findings suggest that these variables are generally considered during course design or implementation. The suitability of the factors, however, is dependent on the nature of the organization into which the program is being delivered, and the selection of the delivery mode. Three tables present study results. (AEF)

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Validating factors that impact on the success of distance learning initiatives

Dean Goodman

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The distance is nothing: it is only the first step that is difficult.

Mme Du Deffand, 1763.

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Validating factors that impact on the success of distance learning initiatives

Introduction

Distance learning has become big business. In recent years, it has grown beyond being a sub-set of the training and education industry into an industry which stands alone in its own right. But much is still unknown about the industry and the opportunities it brings to an organization.

Research is scarce in the distance learning world. Moore and Kearsley (1996) suggest that the time is right to fill this research void (pp. 211-212). In this theoretical vacuum, however, many organizations are turning to distance learning to give themselves a competitive advantage in the global market place. The success of these endeavors has been mixed and many of these successes have been recorded in the literature in the form of case studies.

But why have some distance learning programs succeeded while others have faltered? What is it that distinguishes a successful distance learning program from an unsuccessful one? If suitable answers to these questions can be found, organizations that follow the advice stand to gain a considerable advantage over their competitors. The number of variables that affect the success of distance learning programs is considerable, however, identifying them is the first step in the pursuit of answers to these questions.

While a large number of case studies are identifiable in the literature, there are far fewer research efforts which seek to identify the factors which are critical to the success of distance learning programs. The reason for this, it is suggested, is that it is very difficult to isolate the primary variables upon which success depends. Nevertheless, studies have been conducted which aim to improve the likelihood of success through the identification of such factors.

Given that the number of variables that affect distance learning are so varied, the usefulness of this type of research must be questioned. Are there too many variables, settings and types of media which can impact on the success of a program? Would the research efforts be better spent in other research areas such as policy, marketing or learner support systems?

The purpose of this paper is to review an earlier study which aims to identify the variables affecting the success of distance learning programs in an attempt to validate the usefulness this type of research.

It is suggested that this research is in an embryonic state and that a start must be made in order to realize the full potential of distance learning projects. As a result, the value of research into identifying critical success factors is worthy of the investment. If the success rate of distance learning programs can be improved, other areas will also improve. Marketing will become easier; investment risks will decrease and organization motivation for this agent of change will increase. This can only have a positive effect on the industry.

Variables in distance learning

In 1993, Dr Ellen Wagner, then an associate professor of Educational Technology at the University of Northern Colorado, published a list of 18 factors which, in Wagner's words:

> ...represent a broad look at issues which impact on distance education success, whether one is working in post-secondary, K-12, or corporate training environments. (Wagner, 1993, p. 28).

By 1995, Wagner had reviewed and refined this list; changing several variables and eliminating others. The list now identifies a total of 16 variables which Wagner suggests need to be considered if a distance learning program is to be successful.

While advances in the application of technology have impacted on the practice of distance learning since 1995, the list still serves as a guide to those issues which demand consideration if the distance learning endeavor is to be successful.

In using the list, Wagner acknowledges that the identified variables need to be applied against a "continuum of issues" (Wagner, 1995, p. 18). She suggests that these issues are situation specific and must be viewed in the context of the particular distance learning environment. They range, she argues, from those concerning the simple classroom application of distance learning programs to those that are more applicable to the corporate boardroom. She also suggests that in reviewing the factors, not all situations can be anticipated. The value of the list, she argues, is in the way it is used to guide and plan the distance learning activities.

The list of variables identified by Wagner and a short justification for inclusion on the list is shown below.

Needs assessment. A needs assessment should be conducted to ensure that the distance learning endeavor is targeted correctly.

Audience analysis. Knowledge of the intended audience will assist in preparing the most appropriate strategy.

Instructional design. A systematic design of the distance learning program will assist in ensuring that the training outcome is suitable for the intended purpose.

Course selection. This may include demand for the course, instructor availability, course uniqueness and/or course adaptability. Courses not suitable for distance delivery are unlikely to succeed.

Course reconfiguration. If the course intended for distance delivery is an existing one, is it's design suitable for distance learning?

Lesson planning. In planning lessons for distance delivery, six elements are needed: knowledge of the learners; a starting point; clear instructional objectives; a vision of the content; practice activities; and an ending point.

Interactive instructional strategies. Active learner participation is critical to the success of distance learning programs.

Instructional delivery systems. The means of delivery must be complete, appropriate and maintained.

Adapting media and materials for distance delivery. A variety of learning styles should be addressed through the creative use of media.

Developing effective graphics. Any graphics used in the delivery of the program need to be designed with the delivery medium in mind.

Using facilitators at distance education sites. Competent facilitators who understand the training objectives and the content will assist the distance learning initiative.

Learner and instructor support services.

> The success of a distance learning experience is often determined by the quality of the services that support the educational process (Wagner, 1995, p. 19).

Program evaluation and learner assessment. Evaluation, including learner assessment, should seek to improve both the processes and product of the activity.

Organizational readiness. As an agent of change, any distance learning program must seek organizational support from all levels of the corporate ladder.

Inter-institutional partnerships. The open exchange of information, expertise and ideas will facilitate the success of a distance learning program.

Regulatory environment. The environment into which a distance education program is implemented will have rules and regulations. An understanding of these will increase the likelihood that the activity will be a success.

Method

It is intended to test the validity of these factors by reviewing a number of case studies and journal articles that describe distance learning activities and/or success factors. The case studies and journal articles all relate to organizations that have implemented a distance learning course or program and where the outcome has been positive.

In an attempt to limit the variables impacting on this study, however, not all case studies were accepted for review. The criteria against which case studies were selected are as follows.

- Only case studies which reported the use of electronic media were used (simply in an attempt to reduce the scope of this study and to ensure that the case studies are appropriate to the future of distance learning)..
- Case studies more than five years old were excluded.
- All selected case studies were to provide some degree of description of both the planning and implementation of the identified distance learning activity.

Each of the case studies were reviewed against the factors detailed in Wagner (1995) and an assessment was made regarding whether there was enough evidence to suggest that these factors were taken into consideration during the design or implementation of the course.

Questions were developed to guide the interpretation of the case studies in relating them to Wagner's list of factors. The guiding questions for each of the factors is shown below.

Needs assessment. Is there evidence to suggest that a needs assessment was conducted and used to guide the development or redesign of the course?

Audience analysis. Was an audience analysis conducted either as part of the needs assessment or as an independent analysis?

Instructional design. Is there evidence to suggest that a systematic instructional design method was used in designing or redesigning the course?

Course selection. Was the course selected against criteria and assessed as being suitable for delivery by a distance learning medium?

Course reconfiguration. For existing courses, was the courses specifically redesigned for distance delivery?

Lesson planning. Were lessons planned specifically with a distance delivery mode in mind?

Interactive instructional strategies. Was interactivity considered to be an important element in the implementation of the course?

Instructional delivery systems. Was there any evidence to suggest that an analysis of the delivery system was conducted to ensure that it was suitable and readily available for both the delivery institution and the learners?

Adapting media and materials for distance delivery. Were there various adaptations to the media and materials to ensure that a variety of learning styles were accommodated?

Developing effective graphics. Was there any evidence to suggest that the graphics used were suitable for the particular delivery media?

Using facilitators at distance education sites. Were facilitators or tutors used in a face to face role with the learners?

Learner and instructor support services. Was support available to the learners and/or the instructors to assist in learning or instructing by distance means?

Program evaluation and learner assessment. Is there evidence to suggest that the course was evaluated or that learner assessment results were used to assist with the evaluation of the course?

Organizational readiness. Is there evidence to suggest that the course was implemented with the support of the organization?

Inter-institutional partnerships. Was the course a collaborative effort between two or more organizations where information sharing provided a synergist impact on the outcome?

Regulatory environment. Were the limitations or opportunities associated with the regulatory environment considered during the design and implementation of the courses?

For each positive answer to the above questions, one score was awarded against that particular factor. These were then tallied and the results analyzed in terms of:

- the number of times each factor was identified in the literature; and
- the nature of the context in which the program was implemented compared to the type of media used.

In addition to the case studies, a small number of other articles were included in the analysis. These articles were chosen due to the nature of the data that they presented and the similarity of their aim to the aim of Wagner (1995). The purpose of including these articles was simply to address a potential imbalance that the reporting of the case studies may induce. Stated in another way, some factors may not have been reported due to the obscure nature of the factor itself; not because it was not considered during design or implementation. For example, while the regulatory environment may be an important issue and was considered (even in a subliminal sense), it may not receive much recognition in the cases studies.

The absence of evidence to suggest that the issue was considered may simply be due to the reporting process rather than the events as they occurred. This is not a reflection on the quality of the case study reports but simply a product of the purpose of the reports.

The inclusion of journal articles was designed to counter the argument that if a particular factor was not reported in the case study it does not mean that it was not considered. Inclusion of 'lessons leaned', 'hints and tips' or other relevant articles will balance this potential reporting inadequacy.

Assumptions and limitations

It is assumed that all case studies reviewed were successful. While none of the case studies reported empirical data showing that the course was successful, most indicated that they were successful at least as perceived by the author(s). This assumption is also considered reasonable as most case studies are reported by individuals intimately

involved in the planning and/or implementation of the particular course. As a result, only successful activities are likely to be reported.

The validity of this study is limited by the data collection methods. A review of the literature may not be a true representation of the actual events. A more detailed analysis of the case studies (i.e., an analysis based on data collection methods other than literature reviews) may reveal that more factors than those identified in the paper were assessed. The factors addressed in the literature review, for example, may only be those which are obvious and/or easy to measure. Still others may have been addressed without the knowledge of the designer or Project Manager (e.g., as a routine activity of the organization).

It should also be noted that the methodology only allows for a score of either one or zero to be allocated. This does not recognize the importance the case study or article places on one particular factor when compared with another. In any given article or case study, a single point is awarded regardless of whether a factor is mentioned just once or a dozen times. The relative importance placed on each factor by the case studies was not measured.

One final limitation is the small number of case studies and articles that were reviewed. A larger number would increase the validity of the data.

Results

The results of the literature review revealed that evidence was available to suggest that all of the factors identified by Wagner (1995) were addressed at some stage during the course design or implementation.

A total of nine case studies and three non-case study articles were reviewed. They represented a wide range of settings and media (within the defined limits). A breakdown of the number of case studies and articles reviewed (by setting and media type) is shown in Table 1. Each of the non-case study articles are indicated with an star (*). One star for each non case study.

	Higher education	Business and industry	K-12	No setting indicated	Total
Videoconferencing	1		1	1	3
CD ROM		1			1
Computer conferencing (Asynchronous)	1				1
Internet/Intranet	1			1*	2*
Talkback TV	2				2
Teleconferencing	1				1
Not indicated				2**	2**
Total	6	1	1	4	*12*

*Table 1 - Number of case studies and articles reviewed (by setting and media type). A * indicates a non-case study article. Two *'s indicate two non-case study articles.*

Table 2 shows the number of articles in which evidence was found to indicate that the factors on Wagner's list had been considered during the design or implementation of the course. It also shows the breakdown by factor for both the case studies and the non-case study articles. Finally, Table 2 shows the mean, high score, low score, standard deviation and the number of factors that fall within one standard deviation from the mean.

Factors	Frequency		
	Case studies n = 9	**Other articles n = 3**	**Total n = 12**
Needs assessment	3	1	4
Audience analysis	5	2	7
Instructional design	2	3	5
Course selection	4	0	4
Course reconfiguration	1	1	4
Lesson planning	3	0	3
Interactive instructional strategies	6	3	9
Instructional delivery systems	5	0	5
Adapting media and materials for distance delivery	7	3	10
Developing effective graphics	2	1	3
Using facilitators at distance education sites	3	1	4
Learner and instructor support services	6	1	7
Program evaluation and learner assessment	5	1	6
Organizational readiness	4	1	5
Inter-institutional partnerships	4	0	4
Regulatory environment	2	1	3
Mean (mean as a % of n)	**4.4 (49%)**	**1.2 (40%)**	**5.9 (49%)**
Highest score	**7**	**3**	**10**
Lowest score	**1**	**0**	**3**
Standard deviation	**1.7**	**Not calculated**	**1.9**
Number of factors falling within 1 standard deviation of the mean	**11 (68%)**	**Not calculated**	**10 (62%)**

Table 2 - Number of articles in which evidence was found to suggest that the factors had been considered during the design or implementation of the course.

In addition to the factors identified by Wagner, analysis of the case studies revealed that a number of other factors were also considered to be important in the success of the surveyed case studies and articles. While collection of this data was not identified in the

proposed methodology, they represent a good foundation upon which further research may be based. These findings are shown in Table 3.

Additional factors	Frequency		
	Case studies n = 9	Other articles n = 3	Total n = 12
Understanding of technology by instructors, tutors and learners	3	0	3
Small number of learners per instructor or tutor	1	0	1
Adequate budget and resources available	1	2	3
Suitability of technology (technically, to objectives of course)	2	1	3
Sound marketing tactics	2	0	2
Simple administrative procedures	1	0	1
Good project management skills	1	1	2
Being learner centered	2	0	2
Availability of resources	1	0	1
Total	**14**	**4**	**18**

Table 3- Other factors considered to be important in the success of distance learning programs

Discussion

Highest and lowest scores

The results described above reveal several trends despite the limited number of case studies and journal articles reviewed. The most significant being that evidence was found to indicate that all factors were considered at least three times throughout the twelve articles (25% of the reviewed literature); although all factors were not considered by any single article. This suggests that the factors identified by Wagner (1995) are recognized as variable which warrant consideration.

The lowest scoring factors were: 'lesson planning', 'developing effective graphics' and 'regulatory environment'. However, this does not mean that these factors were not considered during the design or implementation of the course. Instead, it simply may indicate that the factors were not reported (in either a direct or indirect way) as being considered. It is unlikely, for example, that lessons were prepared without some form of lesson plan.

The lack of reporting of these factors is not a reflection on the quality of the case study reports, but rather a reflection of the fact that the case studies were simply recording the success of a particular course delivered by distance means. They were not seeking to measure success against the Wagner variables.

The highest scoring factor was 'Adapting media and materials for distance delivery' (identified by ten articles or 83% of the reviewed literature), followed closely by 'Interactive instructional strategies' (identified by 9 articles or 75% of the reviewed literature). Both indicate the importance placed on using the media to its fullest and seeking active learner participation in the course.

The interactivity issue was stressed in many of the case studies. Although the relative importance of each factor was not measured, it became clear that interactivity was considered a key element in successful distance learning programs.

Setting versus media type

Table 1 shows the number of articles reviewed by setting and media type. The limited number of case studies and other journal articles reviewed does not allow much meaningful interpretation of the data, however, each cell within this table has the potential to be explored further using the Wagner criteria as a basis for an analysis. If more data was collected, this type of analysis would potentially reveal trends in the type of variables each setting and delivery medium depends upon for success.

Assuming the validity of the analysis could be confirmed, the value of this information would be substantial. In the context of this study, however, analysis of this type was not possible due to the shortage of data.

Additional factors

The study also revealed that there was a wide range of additional factors that warrant consideration during the design and/or implementation of a distance learning program. A total of nine additional variables were identified. The most common factors - 'understanding technology', 'budget' and 'suitability of the technology' – were, on occasion, strongly emphasized in the literature. This indicates that there is a case for Wagner's list to be expanded to include some of these additional factors.

It should also be noted, however, that the identification of these additional factors relied on the subjectivity of the researcher and was largely dependent on the semantics of the case study sentence structure. As a result, several of the factors may in fact have been better placed within one of Wagner's factors.

Non-case studies

While the inclusion of the non-case study articles was aimed at leveling the imbalance that may have been present due to the nature of the case study information, it was shown to be an unnecessary precaution. When looked at in relative terms, the results indicate that there was no significant difference between the case study (only) scores and the total scores. The mean score for these sets of data, for example, were (relative to the number in the sample), exactly the same.

This indicates that the inclusion of non-case study articles aimed at proactively addressing this potential for imbalance was not required. Any future studies of this nature should review case studies only.

Generic variables

There were a further nine factors identified which were not included in Wagner's list. This indicates that the range and scope of variables that contribute to the success of distance learning programs is considerable.

The factors identified by Wagner (1995) are valid indicators of the issues which successful distance learning programs should consider during the design or implementation of the program. But the relative importance of each factor will depend upon the individual circumstance associated with the particular program. For example, it is reasonable to assume, based on the findings of this study, that the factors which warrant consideration for a K-12 program which uses videoconferencing will have a different variable emphasis than a business and industry course delivered over the internet.

The conclusion drawn from this is that the determination of a generic and valid set of critical variables is going to present a significant challenge to distance learning professionals interested in this field of research.

Conclusion

The findings from this study indicate that the factors identified by Wagner (1995) are generally considered when designing of implementing distance learning programs. The suitability of the factors, however, is dependent on the nature of the organization into which the program is being delivered, and the selection of delivery mode. Nevertheless, the findings confirm the assertions by Wagner that:

> General recommendations cannot anticipate every situation that may arise in specific distance education applications. Nevertheless, they can serve as benchmarks to guide the planning, development, implementation, and evaluation of distance education systems, programs, courses, and services (Wagner, 1995, p. 18).

This assertion of Wagner's, however, is grounded upon the existing body of knowledge regarding the fledgling distance learning industry. Perhaps at some distance point in the future, general recommendations which have been based on sound research and

evaluation, may be able to anticipate the full range of situations that may arise. The field is young; who knows what may be possible.

There is considerable value in pursuing further research in order to develop a generic set of factors which, if considered, will add to the likelihood of success of distance learning projects. The potential outcome is a key set of factors that are able to be used with confidence by any distance learning project manager.

The range of variables across the scope of possible distance learning alternatives and settings, however, makes it difficult to rationalize just one set of generic factors. Instead, a number of variables, ranked in order of importance, may prove easier to develop and more useful until the research reaches a greater level of maturity. In order to achieve this, however (using the methodology employed by this study), a greater number of cases will need to be reviewed and each one, ideally, should be articulated in terms of the variables being analyzed.

Further research in this area is recommended. The identification of variables which impact on the success of distance learning projects will provide a foundation upon which to commence identifying a quantifiable, generic and valid set of critical success factors for the implementation of distance learning programs. In an attempt to reach this goal the following are offered as potential future research questions.

- What are the variables that impact on the success of distance learning programs in various settings and when using different types of media?
- Can a plan be developed to guide research towards developing a comprehensive, yet functional list of variables to assist in successfully designing and implementing distance learning projects? If so, how can it be implemented to coordinate disparate research efforts?
- Is there a format in which case studies can be presented which will facilitate their use in further research?

- Is it possible to prioritize the variables that impact on distance learning in terms of importance? Should this be done for each distance learning medium and accommodate the range of distance learning environments?

While these questions represent only a starting point for further research, they also expose the need for a considerable research investment in distance learning. More importantly, however, they represent a starting point for cementing distance learning as a competitive business tool. The potential deserves exploration.

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